2003

International Energy Conservation Code

Commercial Applications

Handout

Purpose:

The code was designed to both conserve our country's non-renewable energy resources and to defray the ever increasing energy consumption and costs to the end user. The Federal Department of Energy has mandated that all new remodel construction meet or exceed the minimum requirements of the 2003 International Energy Conservation Code. In conjunction with this mandate, all of the jurisdictions in the Las Vegas valley have adopted this code as law and require that all new structures permitted after August 1, 2005 meet the requirements of this code.

Code Format:

This code was designed to require energy efficiency savings with regard to the building's Exterior Shell Envelope, the Service Water Heating system, the Electrical system and the Plumbing and Mechanical systems. Because of this multi-disciplined approach, the various design professionals for a project must work closely together to integrate each aspect of the building's design into a comprehensive, cohesive package that clearly demonstrates compliance with this code.

Basis For Design:

1. **Basis for Design is IECC Table 302.1 as follows:**

IECC Table 302.1
Exterior Design Conditions (in degrees Farenheit)

Conditions	Value
Winter Design Dry-bulb Temperature	28 degrees
Summer Design Dry-bulb temperature	106 degrees
Summer Design Wet-bulb temperature	66 degrees
Degree days heating	2238
Degree days cooling	3213
Climate zone	5 b

Architectural:

There are two methods for demonstrating compliance with the commercial applications of the 2003 IECC: (1) prescriptive method and (2) component performance method. State the method used to demonstrate compliance with your project in the Energy Code Analysis.

2. **The method you decide on must be so noted in the Energy Code Analysis (see attachment).**

3. **An Energy Code Analysis is required for all plans, whether new construction or TI remodel. This analysis statement should appear next to the Building Code Analysis on the cover page of the architectural plans. (See attachment, and read all items below). Note that if the building**

envelope, or any other unaltered system, is existing and will not be altered by your project, then state "Existing" in the appropriate section of the Code Analysis. No further information is required regarding the unaffected systems. Provide all information to demonstrate compliance with this code regarding the Electrical systems, Service Water Heating systems and HVAC systems that will be altered, added or changed by your project.

NEW CONSTRUCTION:

If Prescriptive Method is Used (for Building Envelope Only)

NOTE: Regarding new construction, shell buildings must comply with the energy envelope requirements of the code at the time of construction. (Individual TI spaces will not pass the requirements of the code for the envelope).

1. **The projection factor (as described in Sec. 802.2.3), must be calculated and listed in the Code Analysis box. The reader must also be directed to a specific detail of the typical projection in the architectural plans.**

2. **The percent of window and glass door glazing to the total wall area of the envelope must be calculated. This calculation must be shown in the Energy Code Analysis.**

3. **Review Tables 802.2(15) for Climate Zone 5b, pages 98 and 99 of the 2003 IECC for the various percent ranges as calculated in item #2 above. Choose the correct range table that applies to your project and copy it into the Energy Code Analysis box on the plans page (you may choose to list only the table line item information that is specific to your project). These are the minimum components required for your project. The Energy Code Analysis and the architectural plans must clearly reflect that these minimum requirements are being met or exceeded.**

If Component Performance Method is Used

If you choose to demonstrate compliance with the code via the Component Performance method, visit the U.S. Department of Energy website and complete the calculations per their free *Com*check or *Com*check EZ program. (You may do the calculations on line or down load the program for future personal use—remember, it's free.) This user-friendly program is useful in "trading-off" components to arrive at the most desirable and/or economical solution to your energy compliance requirements.

- **Once the desired compliant energy package is arrived at, fill in all the general information into the Energy Code Analysis on the plans, and insure that the results gleaned from this analysis are reflected on the appropriate plans pages.**
- **Scan the complete Compliance Report from the computer run for that discipline directly onto that system's plan page.**

- **In addition, submit two copies of the *Com*check analysis and calculations and submit two wet-signed/stamped copies with the permit application.**
- **If HVAC systems are added, provide signed/stamped mechanical system sizing/load calculations for each unit.**

NEW AND REMODEL CONSTRUCTION;

In addition, the following pertinent information must be clearly demonstrated on the appropriate plans pages:

Other Envelope Requirements

1. **All windows must have energy code label displayed on the surface for inspection. Though site built windows are exempt from this requirement, they must be assembled, gasketed and sealed per manufacturer's installation instructions and ASTM E 283**

2. **Loading dock doors that open into conditioned space require weather seal shrouds per Sec. 802.3.5/ and must be specifically shown on the plans.**

3. **Interior walls separating conditioned from unconditioned space must meet the requirements of this code.**

4. **Entry doors that open into conditioned spaces of greater than 3000 square feet require vestibules per Sec. 802.3.6.**

5. **Roof insulation must be installed continuously above the roof sheathing or applied directly to the underside of the roof sheathing. All insulation shall be devoid of gaps or spaces and be securely held in place.**

HVAC New Systems:

1. **If new equipment is being added, complete and provide a wet signed/stamped copy of the HVAC system sizing/load calculations for the project as required in Sec. 803.2.1. Be aware that these calculations must be based on the criteria provided above in Table 302.1.**

2. **Provide all required Mechanical information in the Energy Code Analysis. In addition, provide the Comcheck compliance report for the HVAC system on the mechanical plans.**

3. **State in this analysis which type of system(s) you will be utilizing, simple or complex.**

4. **Provide all supplemental data and calculations for the heating and cooling loads for the project.**

5. **State if economizers will be required for units. If exception is taken for the economizer, state so in Energy Code Analysis with the upgraded unit efficiency rating.**

6. **If the building is over three stories in height, all dampers integral to the energy envelope shall be equipped with motorized dampers. This must be stated in the analysis.**

7. **HVAC components must be clearly marked with their efficiency performance ratings.**

8. **All thermostats must be of the solid-state programmable type.**

9. **All heating and cooling systems must, at least, meet the minimum requirements of IECC Tables 803.2.2(1) thru 803.2.2(5) for simple systems and Tables 803.3.2(1) thru 803.3.2(6) for complex systems.**

10. **List the minimum duct and pipe insulation requirements in the code analysis.**

11. **Provide all systems operation and maintenance manuals for this project per IECC Sec. 803.3.8.3.**

Service Water Heating

1. **Describe the type of service water system equipment to be used in the Energy Code Analysis.**

2. **Insure that all piping is properly insulated per the code schedule. Pipe insulation thicknesses are required to be listed in the code analysis.**

3. **Insure heat traps are installed in non-circulating water heater supply and discharge piping.**

4. **Hot water circulating systems must be installed with automatic or manual shut-off switches that are readily accessible when system is not required to operate.**

Electrical System

General Requirements

1. **All occupied rooms with more than one fixture must meet dual switching requirements per IECC Sec 805.2.1 and .2.**

2. **Automatic shut-off switching is required in buildings or areas larger than 5,000 sf.**

3. **Guestrooms in hotels, motels and boarding houses must have a main switch at the entry door to shut off all permanent lighting and switched receptacles per Sec. 805.2.2.3**

4. **Automatic switching or photocell controls shall be provided for all exterior lighting not intended for 24-hour operation. All exterior fixtures must have an efficiency rating of at least 45 lumens per Watt.**

5. **Tandem wiring is required for fluorescent lighting fixtures per Sec. 805.3.**

6. **Exit signage shall not exceed 5 Watts.**

Interior Lighting Power Requirements

Provide the information regarding the electrical aspects of the IECC in the Energy Code Analysis. Lighting budget compliance with IECC Sec. 805.5 must also be provided on the electrical plans:

1. **Determine the method for calculating the allowable connected power budget per Sec. 805.5.2, Entire Building Method or Tenant Area Method and note the method used in the Energy Code Analysis.**

2. **Provide a schedule of all lighting fixtures planned for this project and calculate the total actual lighting power loads and budget on the electrical calculations page of the plans (see Energy Code Analysis Worksheet, electrical section). The Energy Code Analysis must also state that the actual load does not exceed the budgeted requirements. If *Com*check EZ is used to calculate compliance, the budget calculations and compliance statement may be copied directly onto the electrical plans.**

2003 IECC Energy Code Analysis Worksheet
Commercial Application for Shell Buildings and Tenant Improvements*

(Analysis** to be included on the cover page of all plans adjacent to the Building Code Analysis)

(*NOTE: If TI Space with no work being performed on existing, pre-approved building envelope, state so in analysis and skip to Mechanical Section)
(NOTE: Only information pertinent to your project must appear in the analysis--information not required (left blank) may be omitted from the analysis on the plans).**

Exterior Envelope (per IECC Sec. 802)

Total Area of Project: _____ square feet **% of glass area to total wall area _____%**
Projection Factor: _____

Method of Compliance:

____Prescriptive Method _____Component Performance Method ____*Com*check EZ

Walls:

Insulation applied: ____ between framing members or ____ continuously

Wall Type 1 Height: _____ft
R-value _____
Opaque Area _____ sq. ft.

Wall Type 2 Height: _____feet
R-Value: _____
Opaque Area _____sq. ft.

Fenestration Components:

Window--fixed:
Total area _____ sq. ft
U-factor _____
SHGC _____

Window--operable:
Total area _____ sq. ft.
U-factor _____
SHGC _____

Glass Doors:
Total Area _____ sq. ft.
U-factor _____
SHGC _____

Roll-up Doors:
Total Area _____ sq. ft.
R-value _____

Doors, non-glazed:
Total Area _____ sq. ft.
R-value _____

Other:_____

Total Area _____ sq. ft.
U or R-value _____
SHGC _____

Roof Component:

Insulation applied: _____between framing members _____ continuously

Roof 1: R-Value _____
Roof 1 Area _____ sq. ft.

Roof 2: R-Value _____
Roof 2 area _____ sq. ft.

Skylights: U-factor_____
Total area _____ sq. ft.

Conditioned Floor Area (over unheated space):

Area of overhang/unheated area _____sq. ft.
R-value _____

Building Mechanical System
(per IECC Sec. 803)

HVAC System Type: Simple ___Complex____

(Provide information below for each unit in the system)

System 1 description:_____

Heating Capacity: _____(cap. units):_____ **Cooling Capacity:_____(cap. units):_____**

HVAC Equipment Efficiency Rating_____ **Economizer requirements:_____**

Pipe Insulation: _____Inch(s) **Duct Insulation R-Value:_____**

Ducts: High pressure___ Low pressure___

Note: Comcheck compliance report for mechanical must appear on the Mechanical Plans

Service Water Heating System (per IECC Sec. 804)

Equipment Description Type:_____

Equipment size:_____

Efficiency rating:_____

Note: Information in this section must also appear on the Plumbing plans.

Electrical Lighting Budget (per IECC Sec. 805)

Plans evaluated to the Whole Building Method _____ OR Tenant Area Method _____

Actual designed lighting load is _____% better than calculated lighting power budget.

NOTE: The following calculations must appear on the electrical plans.

Either provide electrical Comcheck EZ Compliance Statement on plans, OR complete the following table for all occupancy types in the space being considered (per IECC Table 805.5.2. In most cases the Whole Building approach is recommended.)

1 Occupancy Type	2 Area of Occupancy	X	3 Lighting budget for Occupancy Type Per Tab.805.5.2 (Watts/sf)	4 Lighting Budget for Area (Watts)
		X		
		X		
Totals		X		

Line A: Allowable Lighting Budget (in watts). Total of all Watts in Column 4: _____Watts

A Fixture ID	B Fixture information Lamp description	Wattage per lamp	Ballast Type	C Lamps/ fixture	D # of Fixtures	E Fixture Watt	F (D X E)
						Total	

Line B: Total Actual Lighting Watts: _____ Watts

Line B must not exceed line A